

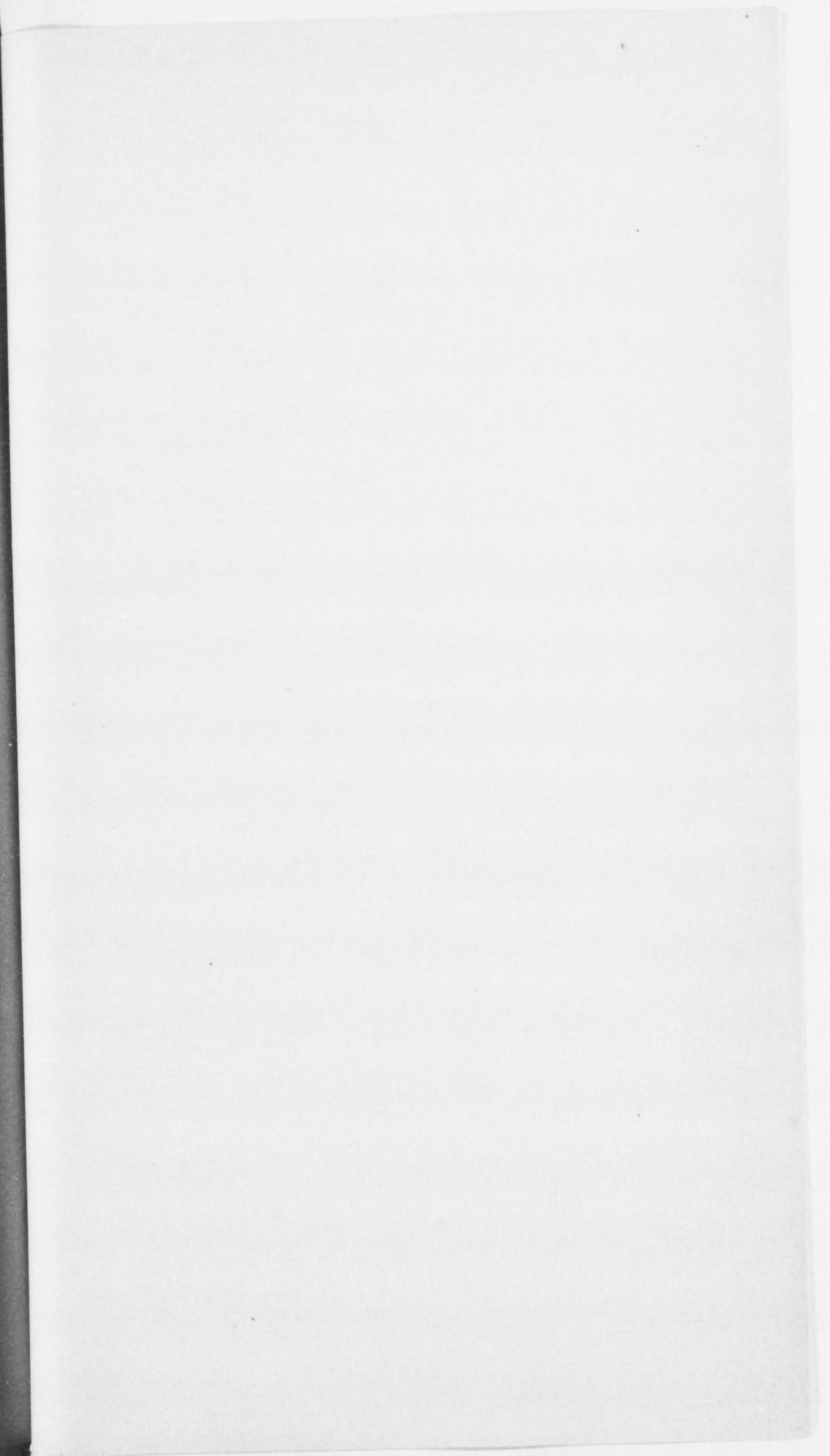
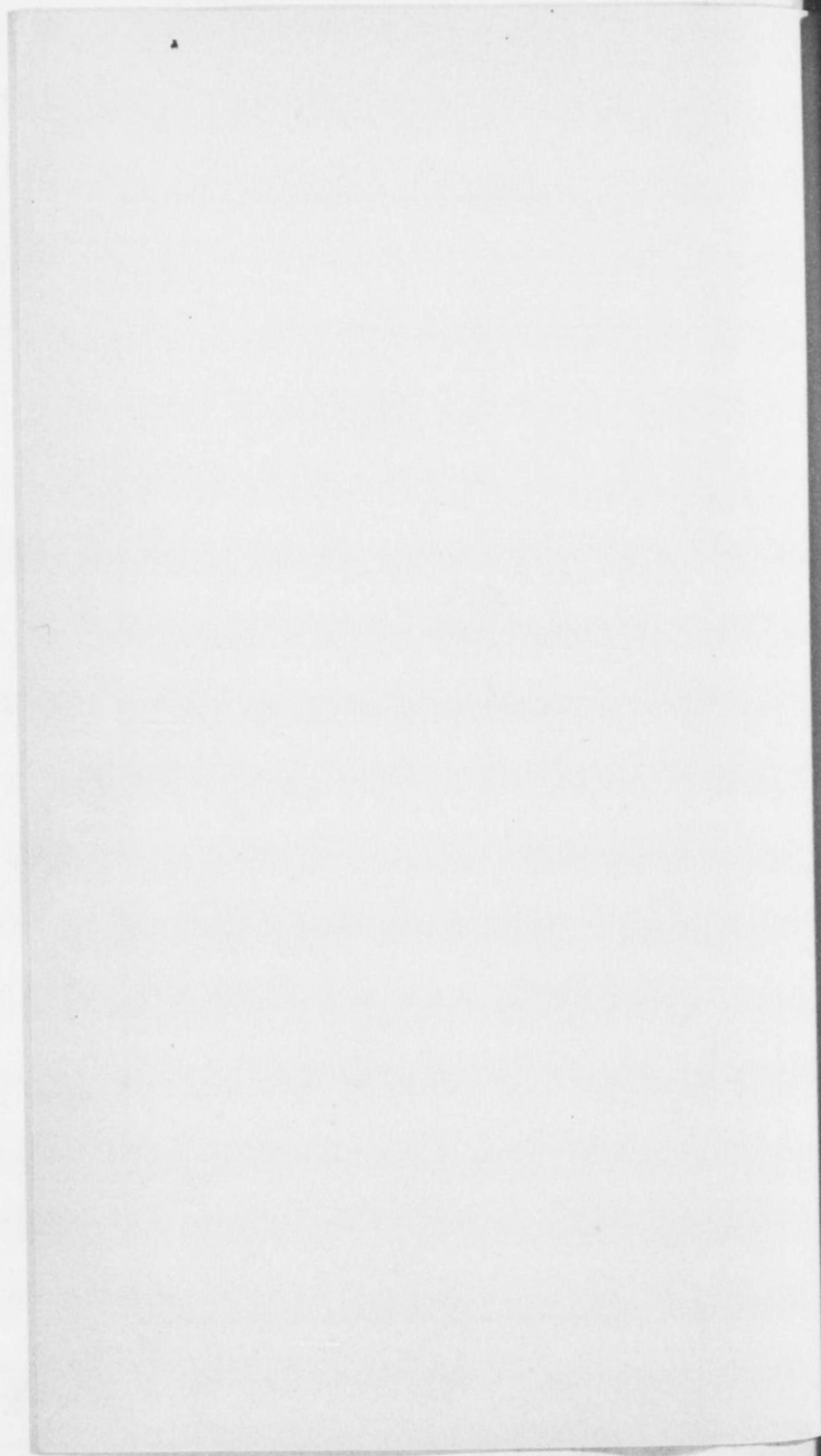
地質調查所報告

第四百四號



始





地質調査所報告 第四百四號

昭和四年九月

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商工省囑託
理學博士

横山 又次郎

能登國七尾港四圍ノ地ノ第三紀鮮新时期ノ化石ヲ産スルコトハ久シク人ノ知ル所ナルヲ以テ昭和二年ノ秋予ハ同地ニ出張シテ之カ採集ヲ試ミタルモ其ノ標本ハ國分岩屋・細口・津向・大杉崎等ノ各所ニ散在シテ其ノ群集シタル個處一モ之ナク且之ヲ破損セスシテ岩石ヨリ掘出スコト頗ル難カリシヲ以テ終ニ多數ノモノヲ獲スシテ已ミス然リト雖モ予カ集メ得タルモノ中ニハ從來他ニ産シタルコトナキ新規ノモノアリ又曾テ二異種ト思ハレタルモノ同一種ニ屬スルコトヲ證明スルモノアリ旁以テ採集ノ無効ニ終ラサリシハ予ガ聊幸トスル所ナリ予ガ集メ得タルモノハ左ノ十一種ナリ

1' Pecten (Patinopecten ?) kagamianus Yok.

1'' Pecten notoensis n. sp.

- 三' *Pecten hastatus* Sow. var. *ingeniosa* nov.
- 四' *Pecten crassivenius* n. sp.
- 五' *Pecten* sp.
- 六' *Terebratulina septentrionalis* Couth.
- 七' *Terebratulina japonica* (Sow.)
- 八' *Terebratella crossi* Dav.
- 九' *Lagœus rubellus* Sow.
- 一〇' *Magellania lenticularis* Desh.
- 一一' *Perudesia grayi* Dav. var. *transversa* Dav.

新規種ニ關スル記事ハ歐文ノ部ニ之ヲ譲ル

土佐國安田町唐ノ濱産介化石

土佐國安田町唐ノ濱産介化石

商工省囑託
理學博士 横山又次郎

昭和三年中、商工省技師鈴木達夫氏、高知圖幅ノ地質調査ニ従事スルヤ、土佐國安田町唐ノ濱ニ於テ介化石ヲ採集セリ、余之ヲ檢シテ左ノ四十六種ヲ得タリ

- 一' *Conus comatosaeformis* Yok.
- 二' *Pleurotoma subdeclivis* Yok.
- 三' *Pleurotoma pervirgo* Yok.
- 四' *Pleurotoma carinata* Gr. v. *woodwardi* Mart.
- 五' *Pleurotoma luedorfi* Lke.
- 六' *Drillia principalis* Pils.
- 七' *Drillia fortirata* Sm.
- 八' *Drillia braunsi* Yok.

- | | | | |
|----|--|-----|------------------------------------|
| 九 | <i>Olivella spretoides</i> Yok. | 一一三 | <i>Polinices ampla</i> (Phil.) |
| 一〇 | <i>Ancilla okawai</i> Yok. | 一一四 | <i>Natica adamsiana</i> Dkr. |
| 一一 | <i>Voluta koyuana</i> Yok. | 一一五 | <i>Submarginula cicatrosa</i> Ad. |
| 一二 | <i>Mitra pristina</i> Yok. | 一一六 | <i>Dentalium weinkauffi</i> Dkr. |
| 一三 | <i>Fusus dualis</i> Yok. | 一一七 | <i>Dentalium suzukii</i> n. sp. |
| 一四 | <i>Siphonalia cassidariaeformis</i> (Rve.) | 一二八 | <i>Corbula tosana</i> n. sp. |
| 一五 | <i>Nassa livescens</i> Phil. | 一二九 | <i>Cultellus</i> sp. |
| 一六 | <i>Nassa festiva</i> Pow. | 一三〇 | <i>Clementia vatheleti</i> Mab. |
| 一七 | <i>Nassaria magnifica</i> Lke. | 一三一 | <i>Chione foliacea</i> (Phil.) |
| 一八 | <i>Dolium costatum</i> Mke. | 一三二 | <i>Chione casinaeformis</i> Yok. |
| 一九 | <i>Rostellaria fusus</i> L. | 一三三 | <i>Tapes</i> sp. |
| 二〇 | <i>Turritella perterebra</i> Yok. | 一三四 | <i>Cardium muticum</i> Rve. |
| 二一 | <i>Solarium perspectivum</i> L. | 一三五 | <i>Diplodonta semiaspera</i> Phil. |
| 二二 | <i>Xenophora exuta</i> Rve. | 一三六 | <i>Cardita panda</i> Yok. |

- | | | | |
|----|---------------------------------------|----|--------------------------------------|
| 二七 | <i>Crassatellites oblongatus</i> Yok. | 四二 | <i>Arca philippiana</i> Dkr. |
| 二八 | <i>Crassatellites yagurai</i> Mak. | 四三 | <i>Limopsis woodwardi</i> Ad. |
| 二九 | <i>Thracia pubescens</i> Pult. | 四四 | <i>Cacullaea concamerata</i> (Mart.) |
| 四〇 | <i>Pecten praesignis</i> Yok. | 四五 | <i>Yoldia</i> sp. |
| 四一 | <i>Pecten vesiculosus</i> Dkr. | 四六 | <i>Nucula mirabilis</i> Ad. et Rve. |

以上列記シタルモノ、死生ヲ考フルニ、約七割ハ生種ニ屬シ、且死種ト思ハルモノモ、其ノ多數ハ鮮新若クハ以後ノ地層中ニ産スルモノナリ、是ニ因テ唐ノ濱ニ露出スル第三紀層ノ、其ノ上部タル鮮新ニ隸スヘキモノナルコトハ幾ト疑ナシ

茲ニ吾人ノ注意ヲ惹クハ、全數中數種ノ純暖國生トモ稱スベキモノ、混産スルコト是レナリ、例ヘハ *Pleurotoma carinata woodwardi* (瓜哇ノ鮮新及ビ非律賓嶋ノグイゴ系、*Rostellaria fusus* (支那海及ビ非嶋グイゴ系産) *Submarginula cicatrosa* (非嶋近海産)等ノ如シ、是レ蓋シ解スルニ難カラサルヘシ、便チ南海西海兩道ノ南邊ハ直接黒潮ノ本流ニ潤フテ、其ノ氣候大ニ融和シ、爲ニ純南方産ノ植物介類中、今尙此ノ地方ニ出沒スルモノアリ、加之ナラス臺灣産鮮新时期介殼ノ研究ニ據レハ、則チ其ノ生存

シタル當時ニ於テハ、内地同島ノ氣候ハ其ノ差現今ノ如ク甚シカラサリシ跡ナキ
ニアラス、是レニ依テ觀ルトキハ、前ノ混出ハ或ハ此等ノ事ニ職由スルモノナラン
カ

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IMPERIAL GEOLOGICAL SURVEY OF JAPAN

REPORT No. 104



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IMPERIAL GEOLOGICAL SURVEY OF JAPAN

REPORT No. 104

Pliocene Shells from near Nanao, Noto

By

MATAJIRO YOKOYAMA, *Rigakuhakushi*

(With 6 Plates)

Long since, the environs of Nanao, a seaport town on the coast of Japan Sea, were known as localities yielding Tertiary shells some of which are of excellent preservation. On these shells kept in the geological museum of the Imperial University of Tokyo, I already made a reference in a paper entitled. "On Some Pliocene Shells from Kaga and Noto" (*Jour. Geol. Soc. Tokyo*, April, 1926), mentioning five species of brachiopods and two of bivalves, one of the latter having been described as new. Hoping that I shall be able to make a large collection of the said fossils, if I undertake a trip to the place myself, I went there in the autumn of 1927. Contrary to my expectation, however, I have been able to bring together only a small number of specimens, chiefly owing to their comparative rarity at any one locality and partly also to the difficulty of isolating them from the in-

The fossil localities are Kokubu (徳田村國分), Hosoguchi (同村細口), Iwaya (七尾町岩屋), Tsumugi (西湊村津向), Osugi-Zaki (同村大杉崎).

cluding sandstone without breaking. Nevertheless, my collection was valuable, as it threw a new light on the mutual relations of the species of *Pecten* hitherto described by me as new, not only from Nanao itself, but also from other parts of Japan.

The number of fossil species which I am now able to mention is eleven. Their names are as follows:

1. *Pecten* (*Patinopecten*?) *kagamianus* Yok.
2. *Pecten notoensis* n. sp.
3. *Pecten* (*Chlamys*) *hastatus*, Sowerby var. nov. *ingeniosa*
4. *Pecten* (*Chlamys*) *crassivenius* nov. spec.
5. *Pecten* sp.
6. *Terebratulina septentrionalis* Coult.
7. *Terebratulina japonica* (Sow.)
8. *Terebratella crossi* Dav.
9. *Liquens rubellus* Sow.
10. *Magellania lenticularis* Desh.
11. *Pereudesia grayi* Dav. var. *transversa* Dav.¹⁾

Description.

1. *Pecten* (*Patinopecten*?) *kagamianus*, YOKOYAMA

Pl. I. Pl. II.

Pecten kagamianus Yokoyama, Some Plioc. Moll. Neog. Izumo, p. 8, pl. II, fig. 1

Pecten permirus. Yokoyama, Some Plioc. Shells Kaga and Noto, Proc. Geol. Soc. Tokyo, vol. XXXIII, 1926, p. 9, pl. II.

1) *Lima* sp. mentioned in my first enumeration is here omitted, because it is a mere fragment whose generic determination is not quite certain.

Shell large, moderately thick, compressed, right valve somewhat more than left, orbicular, slightly longer than high, sub-equilateral except for ears, radiately ribbed, with ribs usually about twenty in number, but rarely increasing to twenty-five or decreasing to about ten. Right valve: Ribs generally low, flatly rounded, somewhat broader than interspaces, bearing a varying number of close longitudinal riblets on their backs; interspaces shallow, smooth or longitudinally costellate, with costellae varying in number, faint or distinct; ribs at the extreme lateral portions of the shell often flat, almost without interspaces, so that their dorsal riblets approach and make the whole surface appear more or less uniformly costellate; ears somewhat unequal, somewhat obliquely truncated in front, with a shallow byssal notch below, radiately costellate with costellae crossed by coarse lines of growth. Left valve: Ribs more elevated and narrower than those of right valve, narrower than interspaces, carrying a varying number of longitudinal costellae on their backs, often replaced by many riblets at the extreme lateral portions of the shell; interspaces between ribs smooth or with interstitial riblets which are faint or distinct; ears subequal, anterior slightly larger than posterior, triangular, radiately costellate. Convexity: Right valve about one-eighth, left about one-sixth of height.

When I created the new species of *Pecten permirus* on specimens brought from Nanao, I did not suspect that it is identical with *Pecten kagamianus* founded on a single specimen from Izumo. Now my new collection proved that they are one and the same. This shows how variable the ribs are in this species, both in number and size.

As to the affinity of the present species to *Pecten (Patinopecten) caurinus* Gould (Arnold, Tert. a. Quatern. Pectens of California, pl. 38, fig. 1) living as well as fossil in Western America, it must be said to be greater than was formerly supposed (Foss. Shells Neog. Izumo, p. 9), for the number of ribs may be twenty or more as in the American. However, there is a marked difference between the two. In the American species the more convex valve is the right and not the left; besides, the dorsal costellation of the ribs is said to be faint and the ears smooth.

Some of our specimens attain a large size. The one measuring 160 millim. in length seems not to be the largest.

This species together with the next is the most frequent bivalve in the neighborhood of Nanao.

2. *Pecten notoensis*, YOKOYAMA

Pl. III. Pl. IV. Pl. V. Figs. 1, 2

Shell of medium size, thick, rather compressed, nearly equi-valve, equilateral except for ears, radiately ribbed. Ribs usually five or six near the beak, more or less elevated though rounded, generally smooth, sooner or later dichotomizing either once or twice, with interspaces narrower, in which there is usually an intercalary rib either appearing only near the ventral border or higher up, sometimes more than half way up the shell; number of ribs at ventral border varying, but often more than thirty, counting both large and small, making inner border unequally serrate. Convexity: presumably nearly equal in both valves of the same individual, but somewhat varying in different ones; equal to from one-fourth to almost one-fifth of height. Ears

unequal, anterior larger than posterior, both radiately costellate; byssal notch distinct, acute. Hinge-length less than one-half of shell-height.

In some specimens, the shell is bent inward as shown in fig. 1, pl. IV, making the convexity greater than when it is not.

This species is closely akin to *Pecten turpiculus* Yok. (Tert. Moll. Shinano. a. Echigo, p. 18, pl. II, fig 4), a species founded on an imperfect left (?) valve from Shinano. The latter, however, has the ribs about ten in number either split into two or three with two or three interstitial riblets. But the bending of the shell in the middle as well as its general appearance strongly reminds us of the species of Noto, particularly when we observe on one of the specimens of the latter (fig. 3, pl. III) a longitudinal striation of the ribs near the beak resembling the trifurcation seen on the Shinano example. Consequently I am of opinion that it is not at all impossible in future to find specimens which will bridge over the gap now existing between the two.

3. *Pecten (Chlamys) hastatus* Sowerby, var. *ingeniosa* nov.

Pl. VI. Fig. 2.

One right valve only.

Shell moderate in size and thickness, compressed, orbicular, nearly equilateral except for ears, radiately ribbed. Ribs a little over twenty, elevated and rounded, usually dichotomous near the beak with two branches equal or unequal, sometimes single accompanied by a small riblet on each side, minutely scaly; interspaces narrower, sometimes with an interstitial riblet which appears either near the ventral border or higher up, reticulate.

Hinge-length almost one-half of shell-length, Ears unequal, anterior longer, both radiately costulate. Byssal notch deep and distinct. Height 65 millim. Length about 63 millim. Depth 13 millim. Hinge length 31 millim.

This shell closely resembles *Pecten hastatus* Sow. var. *hindsii* Carp. (Arnold, Plioc. a. Quatern. Pectens of California, p. 111, pl. 43, figs. 1, 2, 2a) living in Bering Sea as well as on the west coast of America and also fossil in California in which, however, the ribs are said to be smooth. *Pecten islandicus* Müller (Ibidem, pl. 44, figs. 1, 1a) is also closely allied to ours, though the length of its hinge is longer.

4. *Pecten* (*Chlamys*) *crassivenius* nov. spec.

Pl. VI. Fig. 1.

A single left valve lacking both ears.

Shell medium-sized, thick, compressed, orbicular, slightly higher than long, subequilateral, radiately ribbed. Ribs nine, strong, rounded, trichotomous with the middle branch somewhat larger than the lateral ones, coarsely scaly, with interspaces broader and filled with four to five equal or unequal scaly riblets, Inner border crenate. Height 64 millim. Length 62 millim. Depth 12.3 millim.

This shell is also not unlike *Pecten hastatus* Sow. (Arnold, Tert. Quat. Pectens, pl. 42, fig. 1a), though different in finer sculptures.

5. *Pecten* sp.

Pl. V. Figs. 3, 4

Fragments of an almost flat valve (left?) of a *Pecten*. The

sculpture consists of fine radiating ribs usually with an interstitial between which is often nearly as large as the main ones. The number of these two kinds of ribs counted at the ventral border is great, a hundred or more. The ears are somewhat unequal, the anterior being the largest; they are radiately costellate.

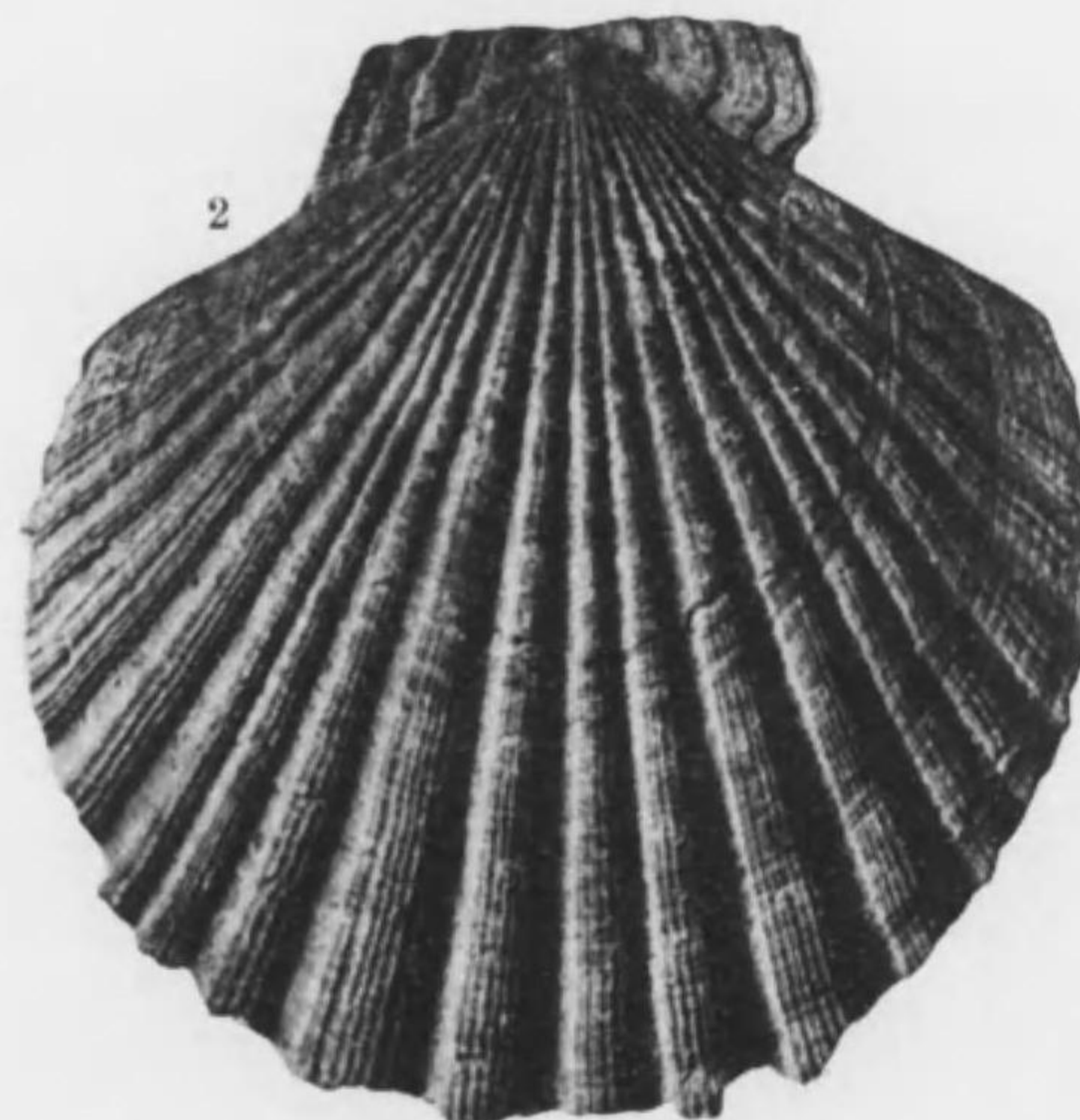
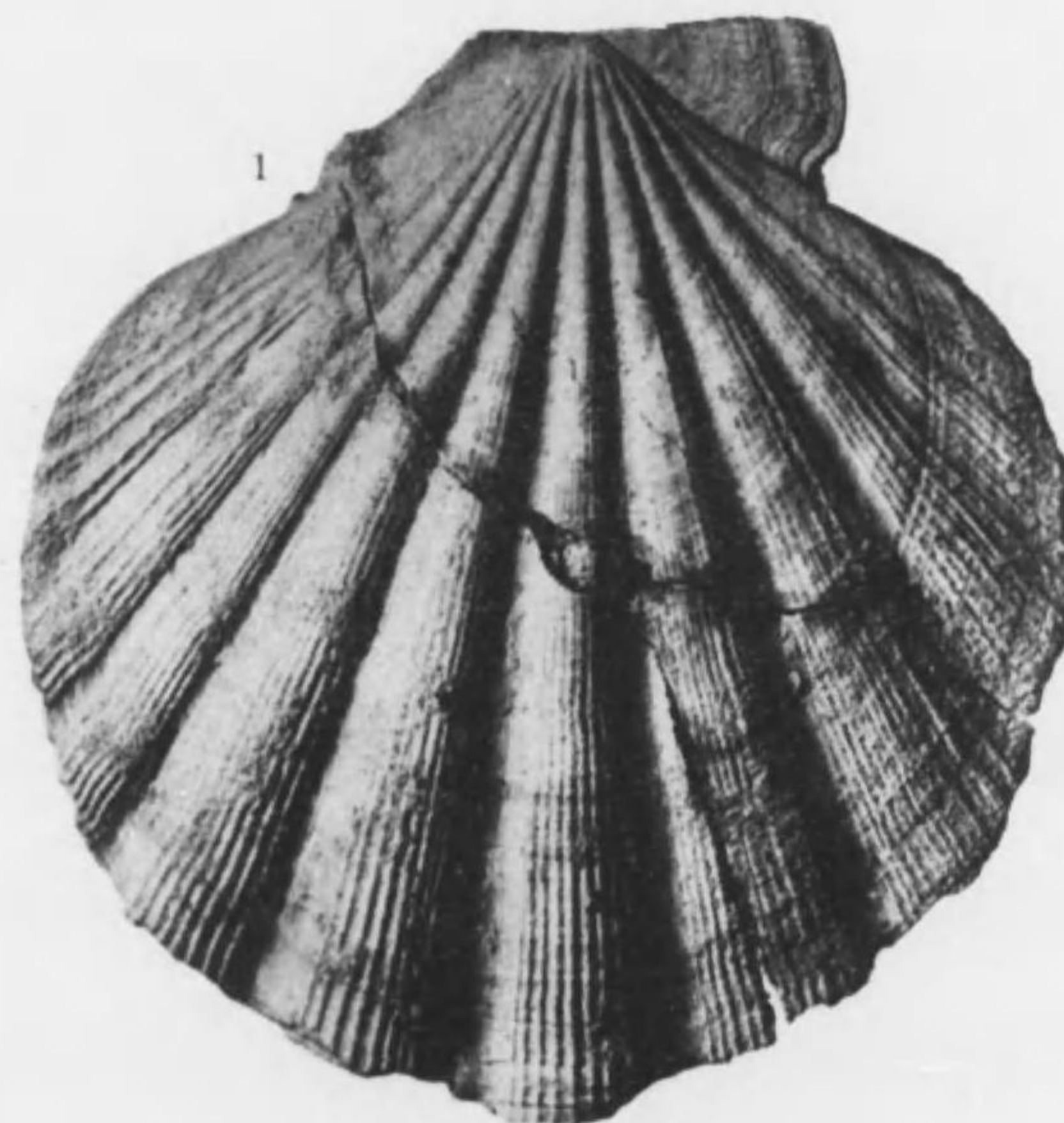
PLATE I.

Plate I

Pecten kagamianus Yok. Right valves
 $\frac{2}{3}$ nat. size. Kokubu. P. 2

Fig. 1. Shows a specimen with only about 10 ribs

Fig. 2. Shows a specimen with about 20 ribs



Pliocene Shells from near Nanao

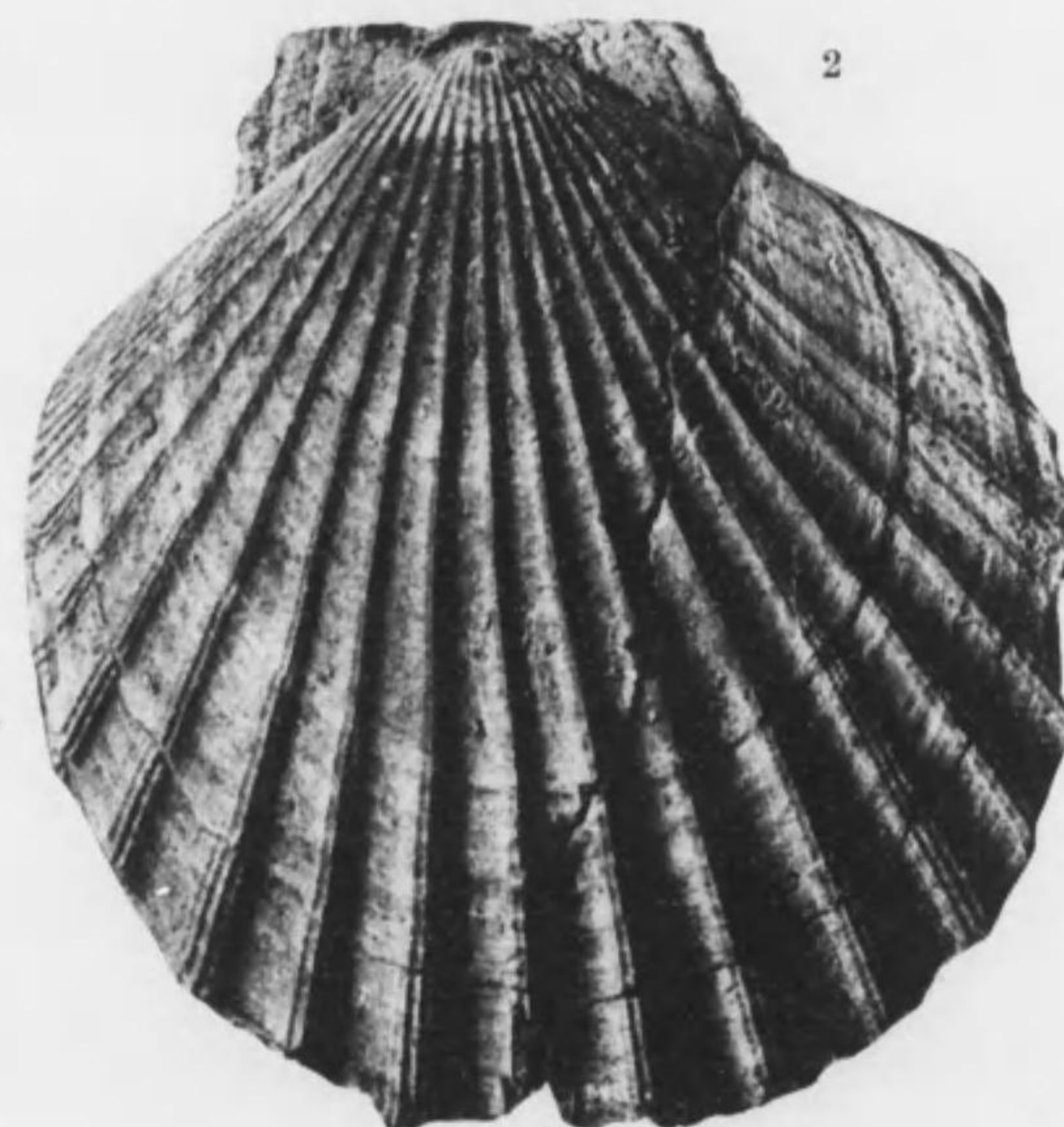
PLATE II.

Plate II

Pecten kagamianus Yok. Left valves
 $\frac{2}{3}$ nat. size. Kokubu. P. 2

Fig. 1. Shows a specimen with more than 20 ribs

Fig. 2. Shows a specimen with about 17 ribs



Pliocene Shells from near Nanao

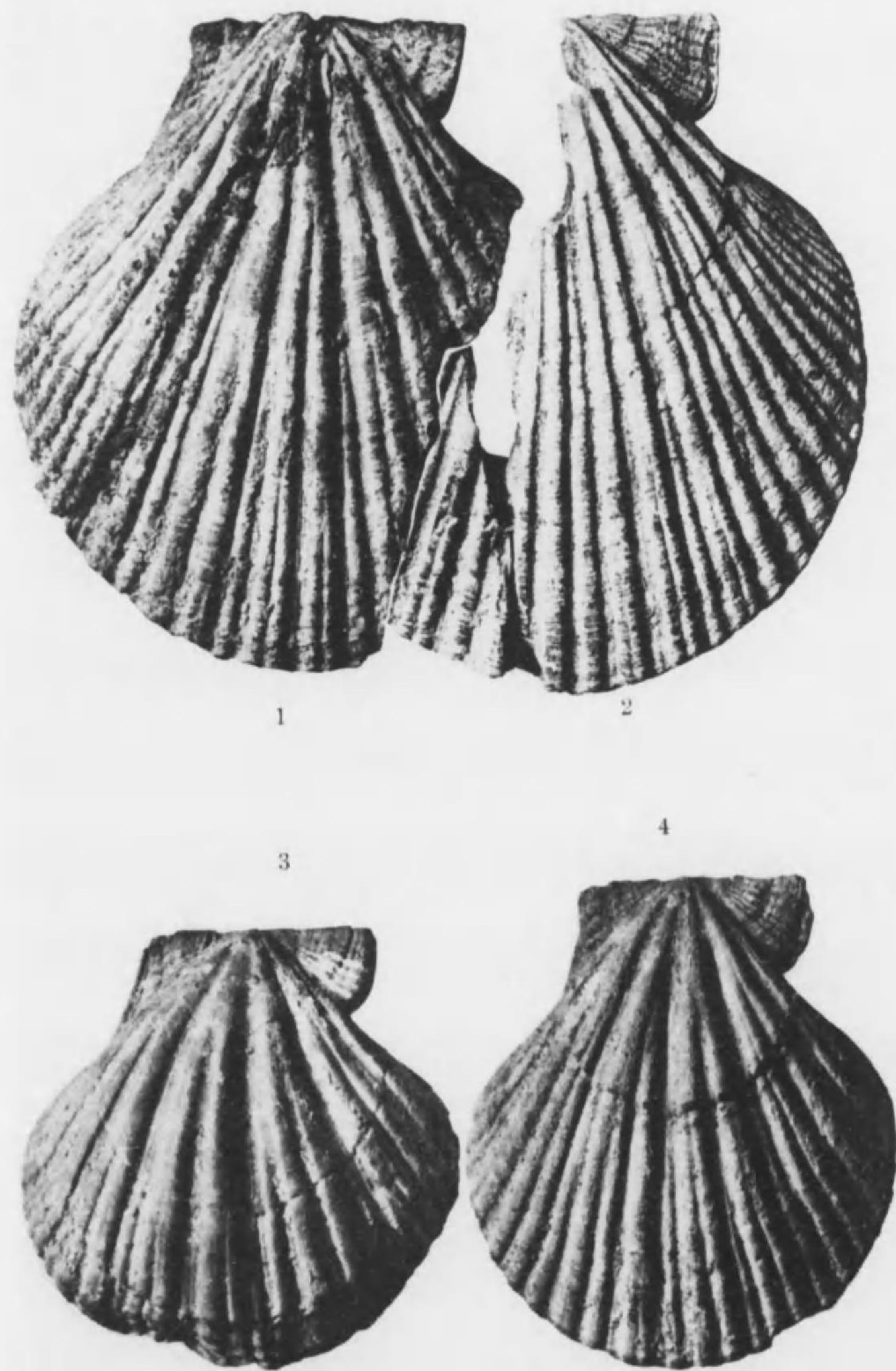
PLATE III.

Plate III

Pecten notoensis n. sp. Right valves
Near Nanao. P. 4

Figs. 1, 2. Specimens with many ribs

Figs. 3, 4. Specimens with a less number of ribs



Pliocene Shells from near Nanao

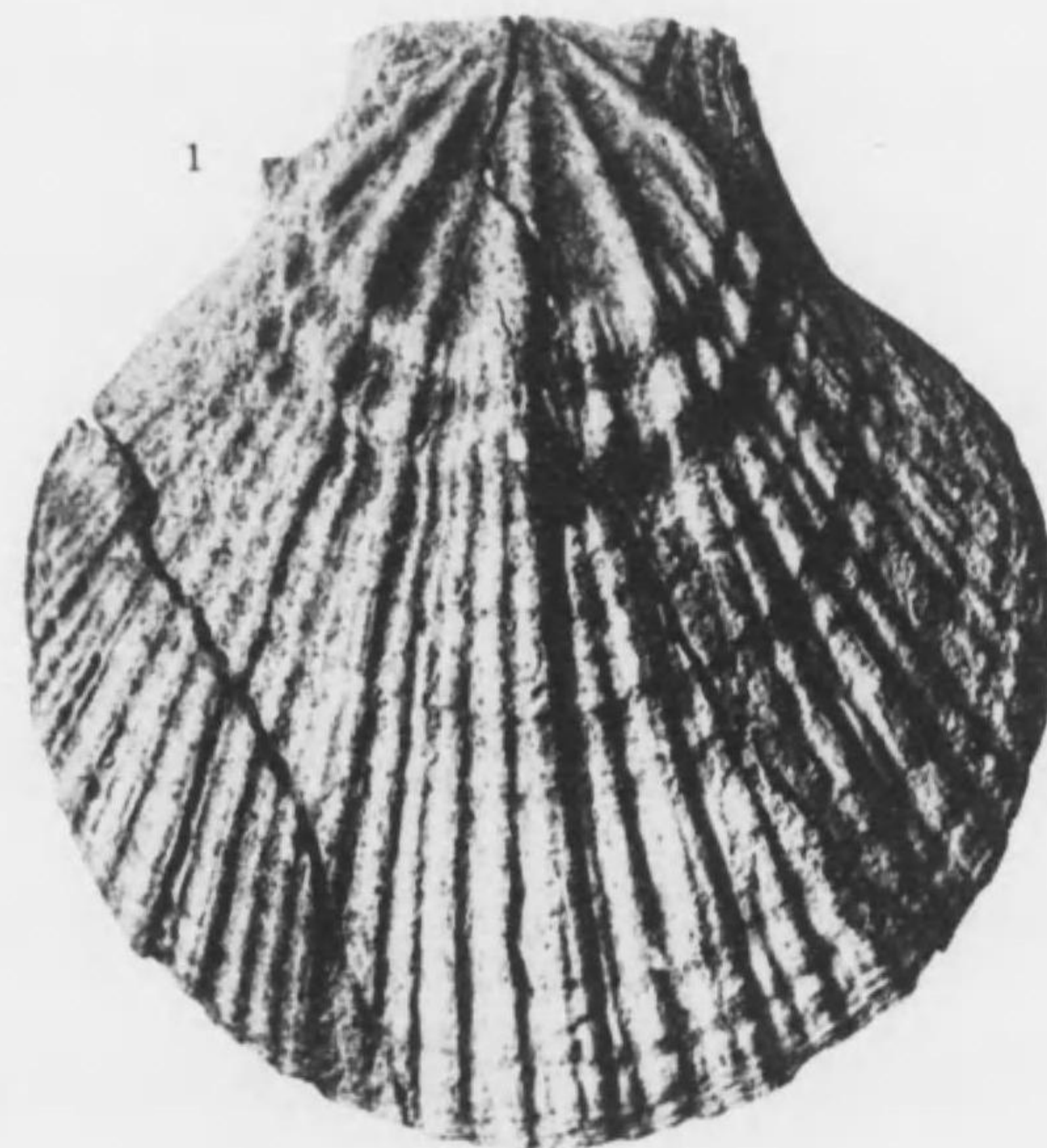
PLATE IV.

Plate IV

Pecten notoensis n. sp. Left valves
Near Nanao. P. 4

Fig. 1. Specimen bent twice above the middle

Fig. 2. A normal form



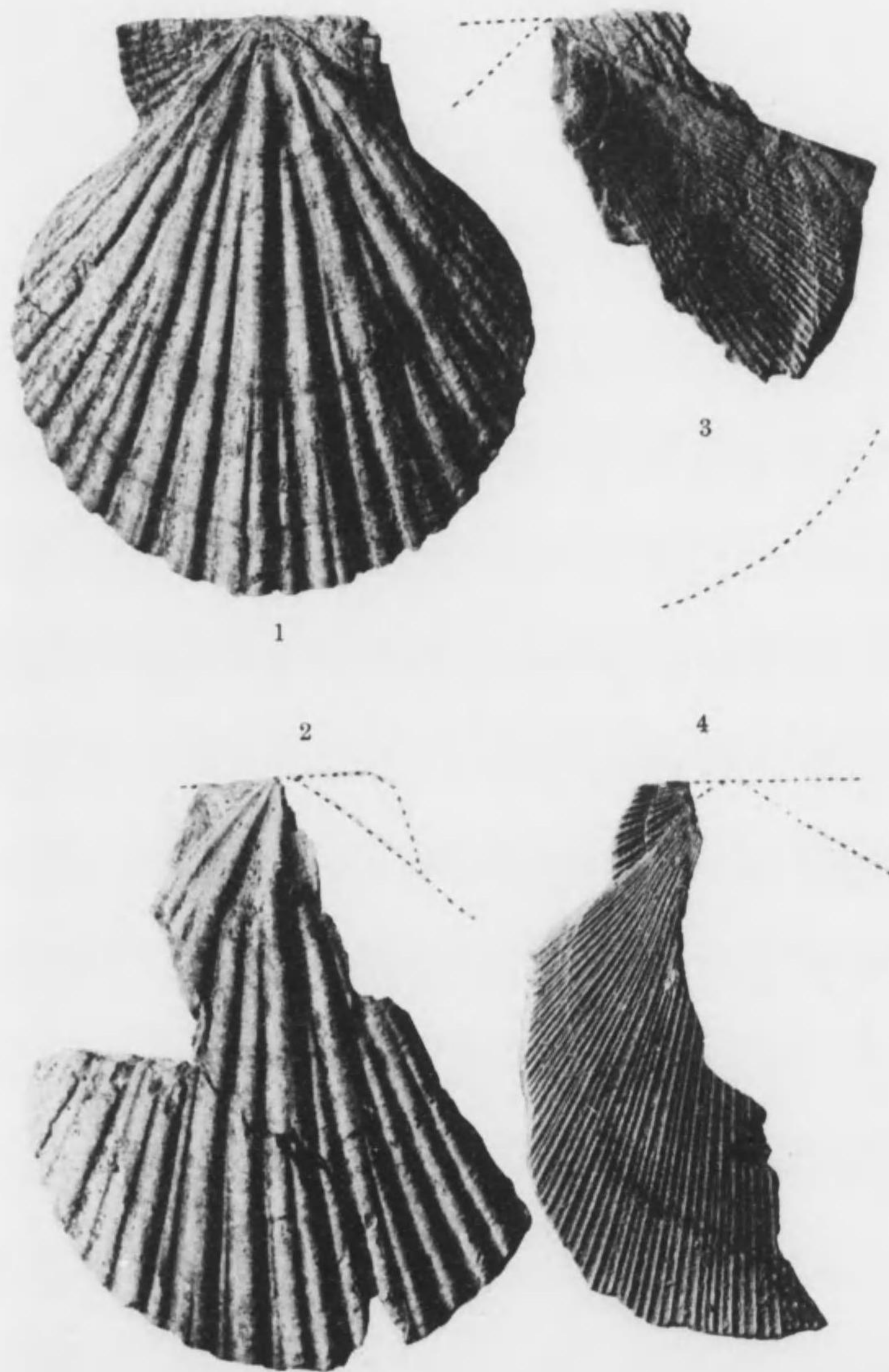
Pliocene Shells from near Nanao

PLATE V.

Plate V

Figs. 1, 2. *Pecten notoensis* n. sp. Left valves
Near Nanao. P. 4

Figs. 3, 4. *Pecten* sp. Iwaya. P. 6



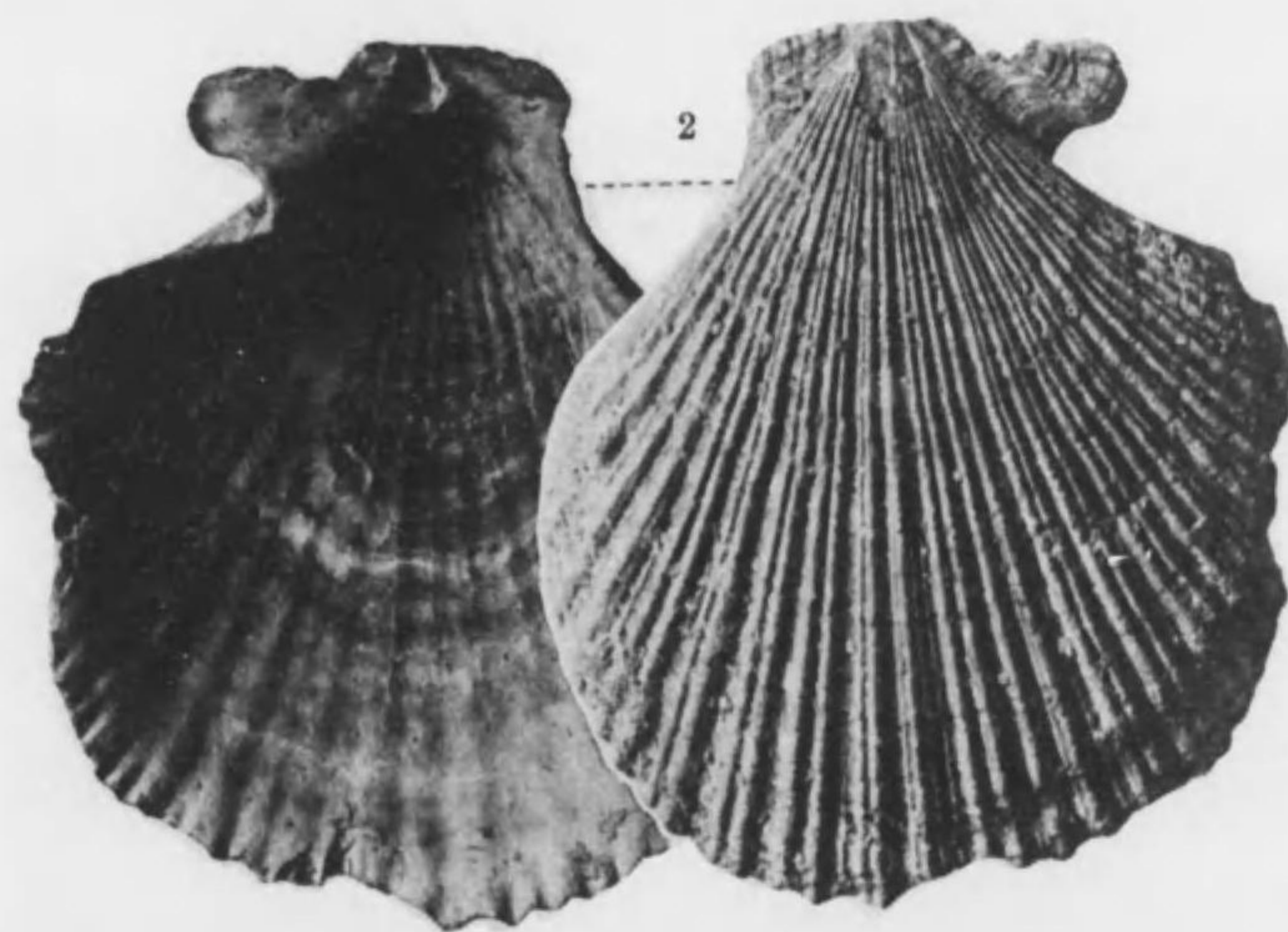
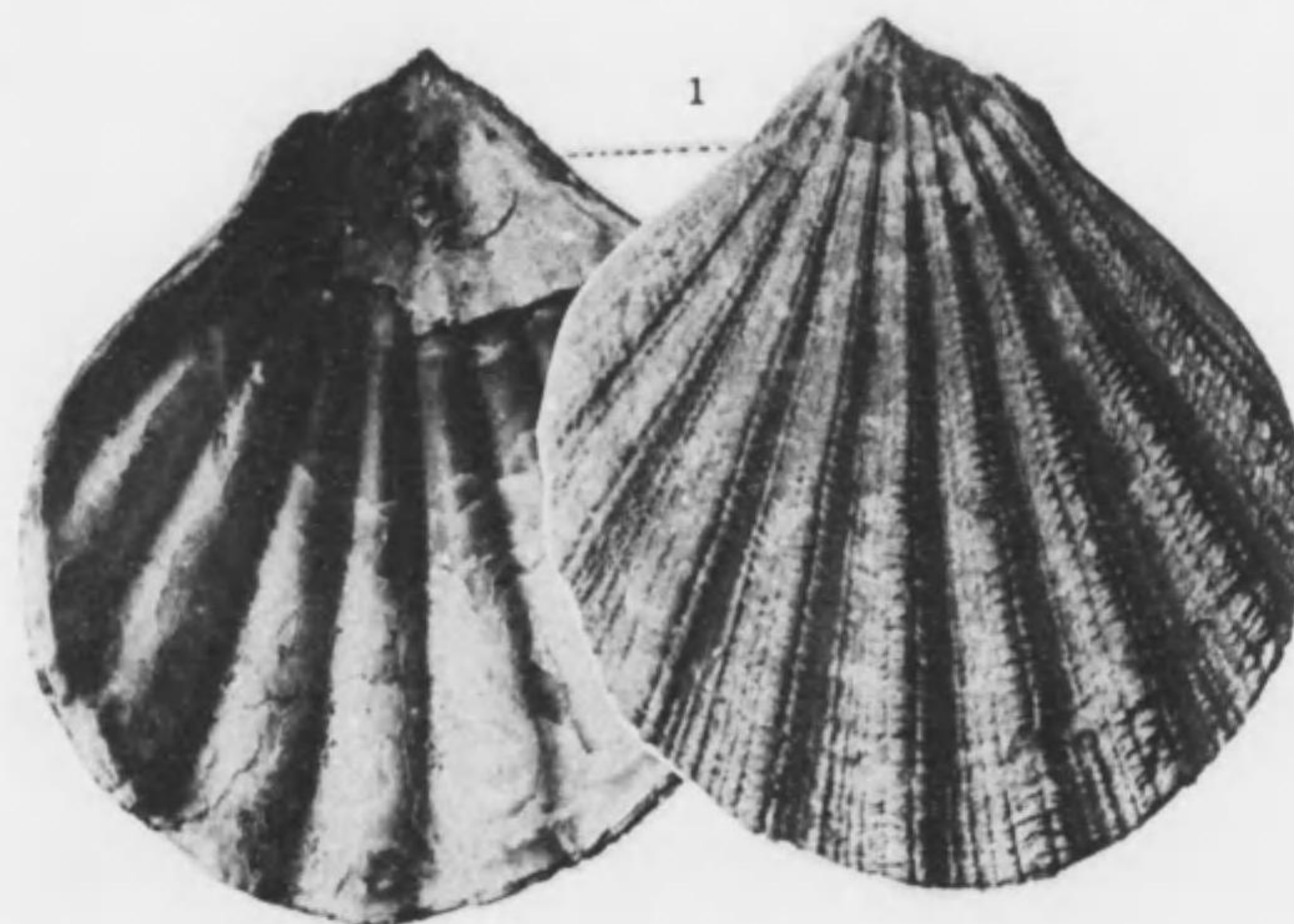
Pliocene Shells from near Nanao

PLATE VI.

Plate VI

Fig. 1. *Pecten (Chlamys) crassivenius* n. sp. near Nanao. P. 6

Fig. 2. *Pecten (Chlamys) hastatus* Sow. var. *ingeniosa* n. near
Nanao. P. 5



Pliocene Shells from near Nanao

Pliocene Shells from Tōnohama, Tosa.

By

MATAJIRO YOKOYAMA, *Rigakuhakushi*.

—•—
(With 2 Plates)

Mr. T. Suzuki, Geologist of the Imperial Geological Survey, while surveying the area included in the sheet-map of Kōchi in the course of the year 1928, collected fossil shells at Tōnohama near the town of Yasuda, Aki County, Tosa Province, and submitted them to me for examination. The species number forty-six in all, some being quite new. In 1927 Mr. J. Makiyama, Assistant Professor of the Kyoto Imperial University has already described thirty-one species of fossil shells from the same place in his "Molluscan Fauna of the Lower Part of the Kakegawa Series in the Province of Totomi" (Mem. Coll. Sci., Kyoto Imp. Univ., Series B, Vol. III, No. 1) of which fourteen species¹⁾ at least are identical with those examined by myself. The Suzuki's collection consists of the following species :

1. *Conus comatosaeformis* Yok.
2. *Pleurotoma subdeclivis* Yok.
3. *Pleurotoma pervirgo* Yok.
4. *Pleurotoma carinata* Gray, var. *woodwardi* Mart.
5. *Pleurotoma luedorfi* Lke.
6. *Drillia principalis* Pils.
7. *Drillia fortilirata* Sm.

1) An exact number is difficult to give, owing to the difference in the denomination of species.

8. *Drillia braunsi* Yok.
9. *Olivella spretoides* Yok.
10. *Ancilla okawai* Yok.
11. *Voluta koyuana* Yok.
12. *Mitra pristina* Yok.
13. *Fusus dualis* n. sp.
14. *Siphonalia cassidaraeformis* (Rve.)
15. *Nassa* (*Niotha*) *livescens* Phil.
16. *Nassa* (*Hima*) *festiva* Pon.
17. *Nassaria magnifica* Lke.
18. *Dolium costatum* Mke.
19. *Rostellaria fusus* L.
20. *Turritella perterebra* Yok.
21. *Solarium perspectivum* L.
22. *Xenophora exuta* Rve.
23. *Polinices ampla* (Phil.)
24. *Natica adamsiana* Dkr.
25. *Submarginula cicatrosa* Ad.
26. *Dentalium weinkauffi* Dkr.
27. *Dentalium* (*Fustiaria*) *suzukii* n. sp.
28. *Corbula tosana* n. sp.
29. *Cultellus* sp.
30. *Clementia vatheleti* Mab.¹⁾
31. *Chione foliacea* (Phil.)
32. *Chione casinaeformis* Yok.
33. *Tapes* sp.

1) Mr. Makiyama identified my *Clementia speciosa* with Mabile's species, and is very probably correct. Therefore I follow here his denomination.

34. *Cardium muticum* Rve.
35. *Diplodonta semiaspera* Phil.
36. *Cardita panda* Yok.
37. *Crassatellites oblongatus* Yok.
38. *Crassatellites yagurai* Mak.
39. *Thracia pubescens* Pult.
40. *Pecten* (*Amusium*) *praesignis* Yok.
41. *Pecten vesiculosus* Dkr.
42. *Arca* (*Scapharca*) *philippiana* Dkr.
43. *Limopsis woodwardi* Ad.
44. *Cucullæa concamerata* (Mart.)
45. *Yoldia* sp.
46. *Acila mirabilis* (Ad. et Rve.)

This fauna is quite similar to that of Ōno, also near the town of Yasuda, collected by Mr. Suzuki in 1926, and described by me in the same year (Tertiary Shells from Tosa, Jour. Fac. Sci., Imp. Univ. Tokyo, Sec. II, Vol. I) as well as to that of the Pliocene of other parts of Japan. Therefore, it is safely to be regarded as *Pliocene*. It is here to be noted that there are a few purely southern forms intermingled in the fauna, such as *Pleurotoma carinata woodwardi*, *Rostellaria fusus* and *Submarginula cicatrosa*. This may possibly be due to the position of the locality lying in a region where still at present some tropical forms linger, both vegetable and molluscan.

Description of Important Species

1. *Conus comatosaeformis* YOKOYAMA.

Pl. VII. Fig. 7

Conus comatosaeformis. Yokoyama, Moll. Oil-Field Taiwan, Report Imp. Geol. Surv. Japan, No. 101, p. 29, pl. I, fig. 10.

A single example. This species is so far interesting, as it has recently been described by me from the Lower Byoritz (Pliocene or Miocene) of Formosa.

4. *Pleurotoma carinata* Gray, var. *woodwardi* MARTIN.

Pl. VII. Fig. 4

Pleurotoma carinata, var. *woodwardi*. Yokoyama, Moll. Oil-Field Taiwan, p. 32, pl. I, fig. 17.

This shell originally described from the Pliocene of Java and afterwards found in the Vigo Group (Miocene according to Dickerson) of the Philippines was also discovered in the Upper Byoritz (Pliocene) of Formosa.

The specimen is single, not quite perfect.

13. *Fusus dualis*, YOKOYAMA.

Pl. VII. Fig. 5

Fusus dualis. Yokoyama, Plioc. Shells Hyuga, p. 344, pl. LXVII, fig. 3.

When I first described this species, the examples which I then had were few and none had the canal perfect. On this account, I judged it to be only moderate in length. However, among several specimens which I now possess, though smaller

in size, there are some with the canal perfect, which is tolerably long, bent somewhat backward as well as sideward. The figured one is 27 millim. in length and 10.4 millim. in diameter, with ten plicae on the last whorl.

The species was found in Zone B of Kōunji and Uwai in Hyūga which is Pliocene in age.

18. *Dolium costatum*, Menke.

Pl. VII. Fig. 2

Dolium costatum. Menke, Syn. II. ed., Append. Reeve, Conch. Icon., Dolium No. 8, pl. V, fig. 8. Küster in Syst. Conch. Cab. Mart. Chemn., p. 61, pl. 56, fig. 3, pl. 57, fig. 13. Iwakawa, Cat. Jap. Moll., p. 99.

A rather thin shell with four flattened spiral ribs narrower than interspaces in which there is a very weak interstitial riblet. On the body-whorl and base there are altogether seventeen ribs with interspaces broader, and comparatively broader in the upper part than in the lower, in which latter the interstitial is lacking.

A single example. Still living in Central Japan as well as in the Philippines.

19. *Rostellaria fusus*, Linne.

Pl. VII. Figs. 1

Rostellaria fusus. Tryon, Man. Conch., VII, p. 128, pl. X, fig. 17, pl. XI, fig. 21. Dickerson, Rev. Phil. Palaeont., p. 225, pl. V, figs. 1 a b.

Rostellaria rectirostrum. Sowerby, Thes. Conch., I, pl. V, figs. 8, 10.

A large fine specimen lacking the apical portion, the outer lip and the lower end of the canal. The intact whorls are eight, of which the younger ones are longitudinally weakly plicate, while the lower are smooth. Diameter of body-whorl 38 millim.

This species is still living in Formosa and further south. The fossil has already been reported from the Vigo group of the Philippines.

25. *Submarginula cicatrosa* (A. Adams)

Pl. VII. Fig. 3

Submarginula cicatricosa. Tryon, Man. Conch., Vol. XII, p. 286, pl. 43, fig. 86.

Tugalia cicatrosa. A. Adams. Proc. Zool. Soc., 1851, p. 89, no. 7. Sowerby, Thes. Conch., III, p. 222, pl. XIV (248) fig. 14.

A single example, rather depressed, longly oval in outline, with numerous radiating riblets crossed by concentric striae. Vertex subposterior, base arched, margin of aperture crenulate. Length 9 millim. Breadth 5.8 millim. Height 3.4 millim.

Living in the Philippines.

27. *Dentalium (Fustiaria) suzukii*, n. sp.

Pl. VII. Figs. 6, 6a

Shell moderately curved, circular in section, gradually tapering towards one end, smooth and glossy on surface. Aperture oval, provided with a deep narrow slit at first more or less straight, but afterward zigzag and bent, showing a rather irregular course.

Only one specimen. Length 38 millim. Diameter of larger end 3.8 millim., of smaller 1.7 millim.

This shell is closely akin to what was described by me as *Dentalium (Fustiaria) nipponicum* from the Upper Musashino of the neighbourhood of Tokyo (Foss. Up. Musashino Kaz. Shim., p.

119, pl. VI, fig. 7), but is more slowly tapering, with the slit much deeper and irregular.

28. *Corbula tosana*, n. sp.

Pl. VIII. Fig. 1

Shell small, thick, moderately convex, somewhat inequilateral, subtrigonal in outline, longer than high, rounded in front, somewhat obliquely subtruncate behind, with antero- and postero-dorsal borders sloping, the latter meeting with posterior border at a very obtuse angle, arched at ventre, with postero-ventral corner acute. Surface concentrically coarsely furrowed, with a sharp posterior edge. Beaks small, pointed, bent forward. Anterior muscular impression bean-shaped, posterior oval. A perfect specimen, 16.5 millim. in length, 11.7 millim. in height, 7.9 millim. in thickness.

This species resembles *Corbula erythron* Lam. as well as *Corbula cuneata* Hinds (Reeve, Conch. Icon., sp. 33), but the former is thicker and longer, while the latter is higher.

38. *Crassatellites yagurai*, MAKIYAMA.

Pl. VIII. Fig. 3

Crassatellites yagurai. Makiyama, Moll. Fauna Low. Part Kakegawa Series, p. 38, pl. II, figs. 1-4.

Crassatellites oinouyei. Yokoyama, Moll. Oil-Field Taiwan, p. 89, pl. XIII, figs. 1-3.

We have three left valves which are larger than those found in Formosa.

When I was preparing a paper on the Formosan fossils last year, from some reason or other Mr. Makiyama's work above

cited was not in my hand. Consequently I was not aware of the name which he had already given to the species. This is the reason why I here suppress mine.

This species according to Makiyama occurs not only in the Kakegawa Tertiary, but is said to be also living in Formosa.

39. *Thracia pubescens*, Pultney

Pl. VIII. Fig. 4

Thracia pubescens. Yokoyama, Foss. Shells Saishu, p. 6, pl. I, fig. 1. Neog. Shells Oilf. Higashiyama. p. 254.

A large specimen with both valves intact, though lacking the posterior end as well as the lower margin. The right valve shows the middle part of its dorsal surface just in front of the dorsal edge slightly concave, which makes the ventral border somewhat retuse at the place as is also shown in the figure given by Forbes and Hanley in his "British Mollusca" (Vol. IV, pl. XVI, fig. 2). The only difference from the living Atlantic form is in its shorter shell, a character often observed in several other species of living shells now found in a fossil state.

Living in the Atlantic Ocean as well as fossil in the English Crag and Japanese Musashinos.

42. *Arca philippiana*, Dunker.

Arca philippiana. Yokoyama, Moll. Oil-Field Taiwan, p. 104, pl. XII, figs. 4, 5.

Several examples.

The species is living in Central Japan as well as in China, but already found as a fossil in the Upper and Lower Byoritz Beds of Formosa.

44. *Cucullaea concamerata*, (Martini)

Pl. VIII. Fig. 2

Cucullaea concamerata. Yokoyama, Tert. Moll. South. Totomi, p. 360, pl. XII, fig. 2.

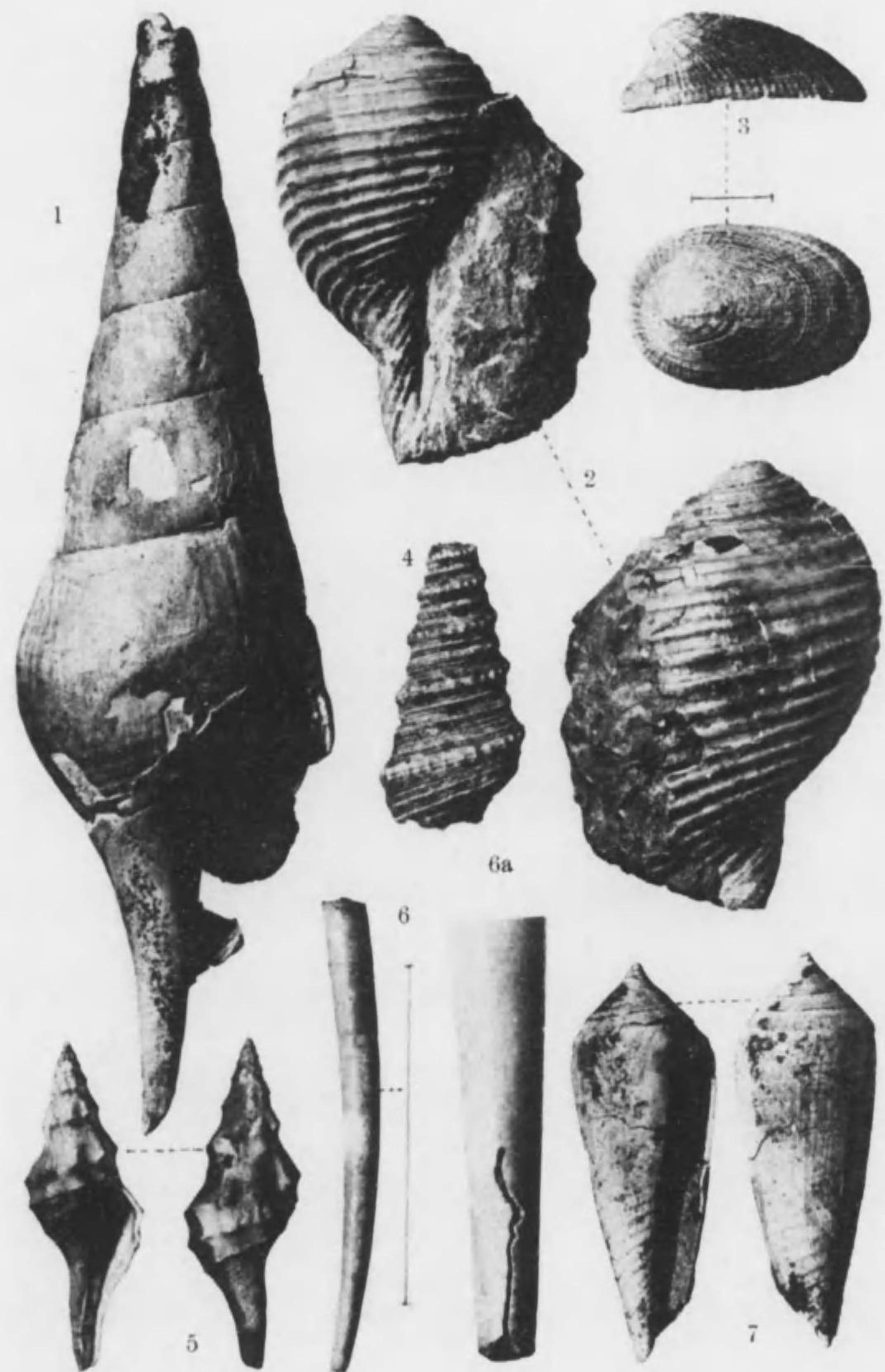
A specimen which I had described from the Satsuka Beds (Pliocene) of Tōtōmi was a mere fragment. What I now have is a large right valve, only a little imperfect.

This species is living in Central and Western Japan as well as in the seas of China.

PLATE VII.

Plate VII

- Fig. 1. *Rostellaria fusus* L. P. 13
Fig. 2. *Dolium costatum* Mke. P. 13
Fig. 3. *Submarginula cicatrosa* A. Adc. P. 14
Fig. 4. *Pleurotoma carinata* Gray, var. *woodwardi* Mart. P.12
Fig. 5. *Fusus dualis* Yok. P. 12
Figs. 6, 6a. *Dentalium (Fustiaria) suzukii*, n. sp. P. 14
Fig. 7. *Conus comatosaeformis* Yok. P. 12

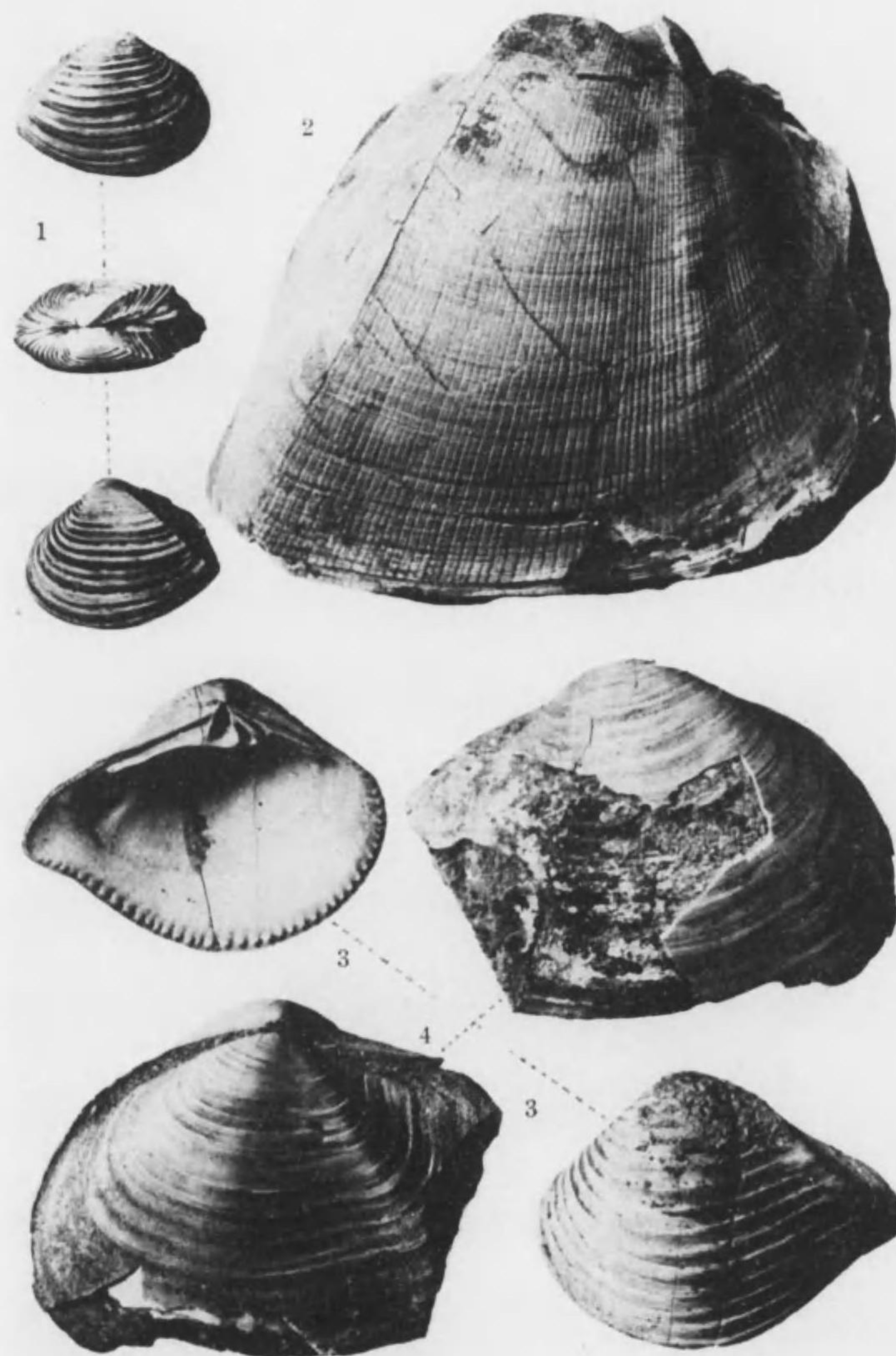


Pliocene Shells from Tōnohama

PLATE VIII.

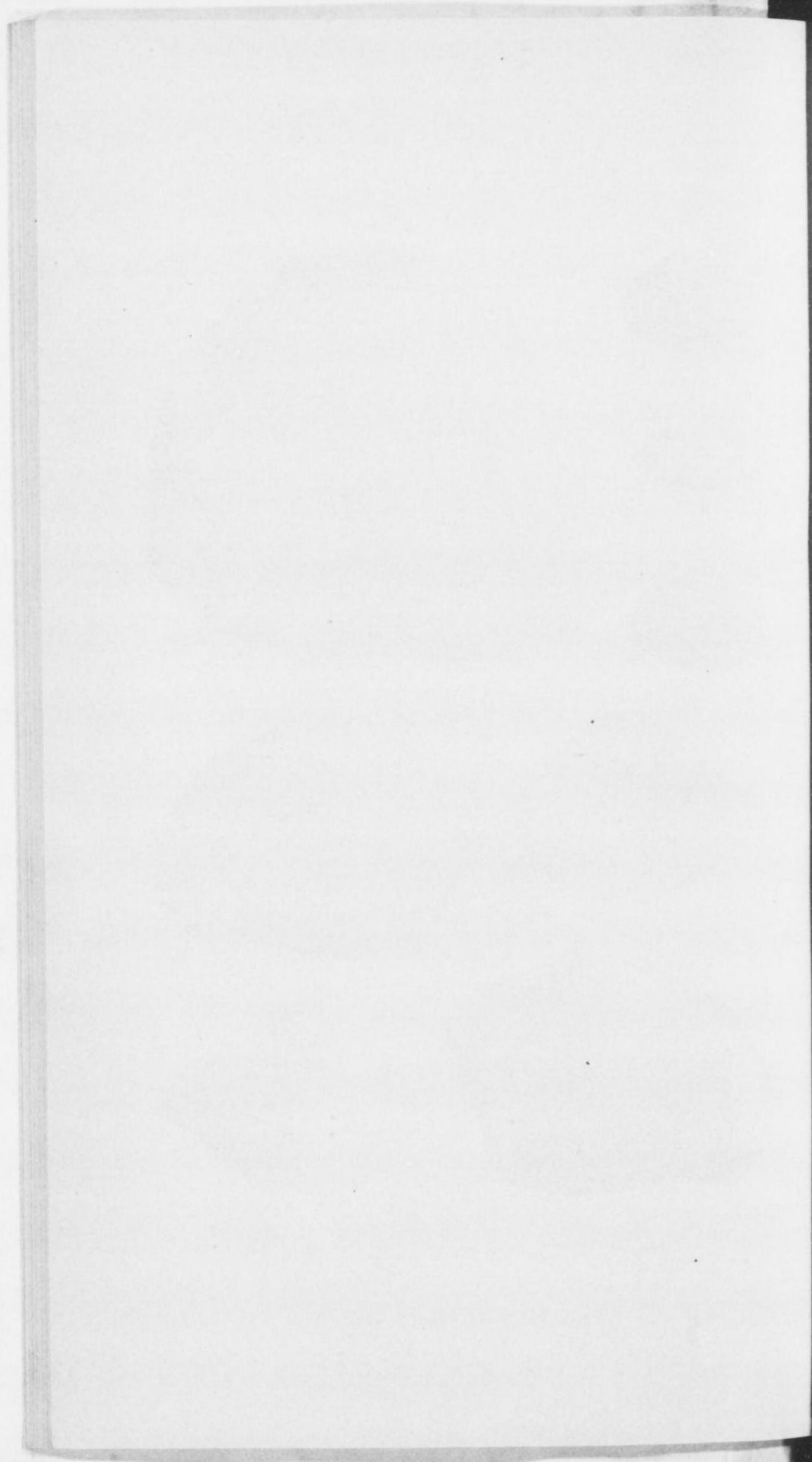
Plate VIII

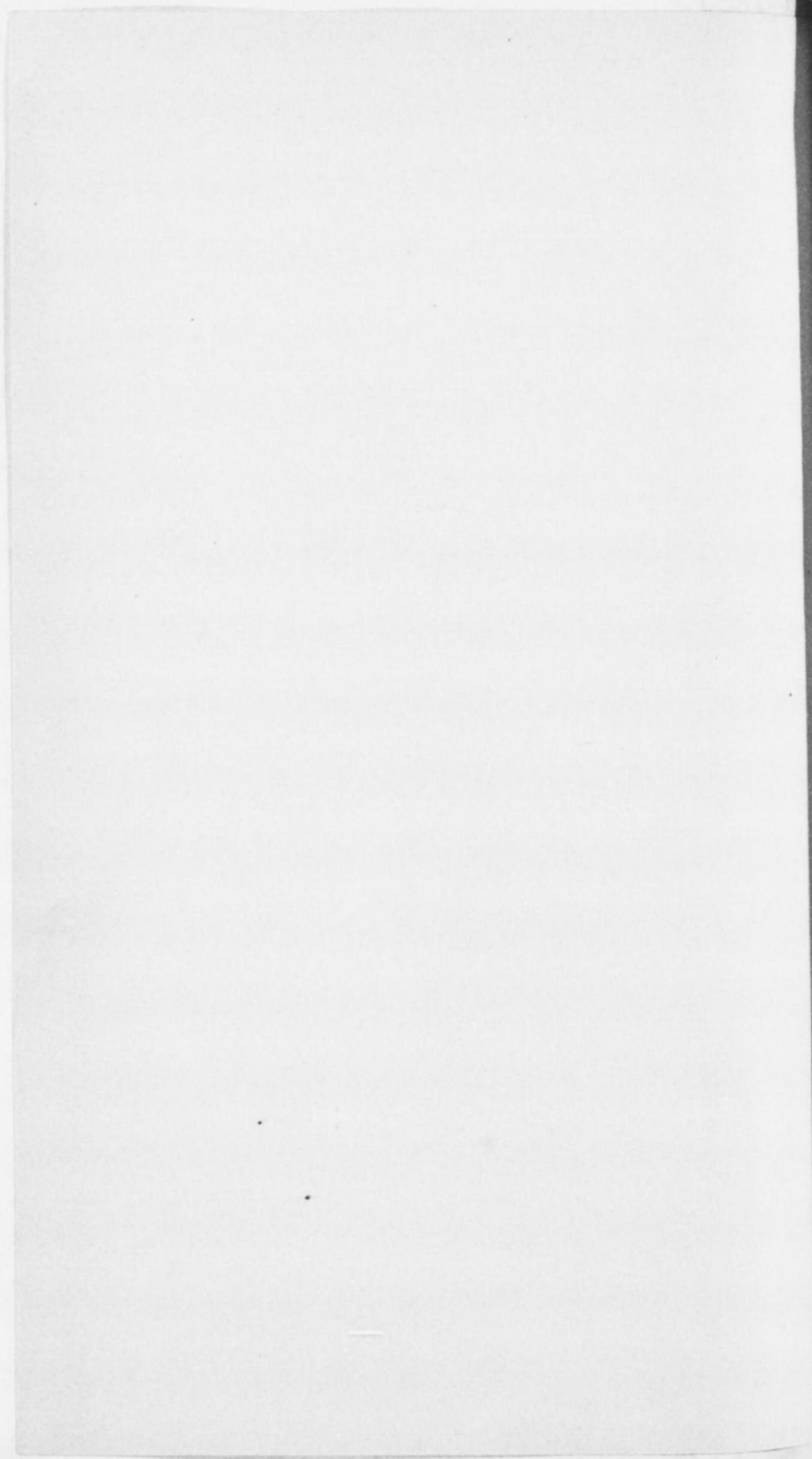
- Fig. 1. *Corbula tosana*, n. sp. P. 15
Fig. 2. *Cucullaea concamerata* Mart. P. 17
Fig. 3. *Crassatellites yagurai* Mak. P. 15
Fig. 4. *Thracia pubescens* Pult. P. 16



Pliocene Shells from Tōnohama







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GEOLOGICAL SURVEY
OF
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